

AMENDMENT UNDER 37 C.F.R. §1.111
U.S. Application No. 09/492,300
Attorney Docket No. Q55891

REMARKS

Claims 1-16 are all the claims pending in the application.

This Office Action is responsive to Applicant's Amendment filed on May 29, 2002.

Claims 1-16 are pending, including newly added claims 7-16.

The Examiner objects to claims 14-16, but indicates that they would be allowable if rewritten in independent form. Applicant does not rewrite these claims in independent form at this time.

Applicant amends claim 14 to correct a minor typographical error. Applicant adds claim 17 to describe an alternative scope of coverage for the invention.

The Examiner rejects claims 1-11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,986,662 to Argiro et al. in view of U.S. Patent No. 5,892,840 to Jang et al. The Examiner also rejects claims 12-13 under § 103(a) as being unpatentable over Argiro in view of Jang and further in view of U.S. Patent No. 6,269,565 to Inbar et al. Applicant respectfully traverses these rejections.

First, it would not have been obvious at the time of the invention to combine the references cited by the Examiner. Applicant's invention is a unique and non-obvious display device for displaying medical diagnosis information including images and text. One having ordinary skill in the art at the time of the invention would not have been motivated to combine Argiro and Jang because the two references relate to incompatible image devices and methods.

In particular, Argiro relates to rendering a computer graphic model of an object, and more specifically to volume rendering methods for displaying three-dimensional image data sets using

voxels (Argiro, column 1, lines 7-10 and column 2, lines 46-53). Argiro discloses that volume rendering is superior to two-dimensional polygon based rendering methods, because two-dimensional images lack realistic solid continuity (Argiro, column 1, lines 60-65). In addition, Argiro discloses that in voxel rendering, the transparency of the voxels determines how the three-dimensional model is rendered, so that depending on the application, volume rendering of an object may require voxels with different opacity presets. Furthermore, the more transparent and a voxel is, the more it is indistinguishable from the background.

By contrast, Jang relates to image processing of an image acquired using screen/film x-ray radiography (Jang, column 1, lines 6-10). More specifically, Jang detects an irradiation field in a two-dimensional radiographic image and masks or reduces the non-irradiation field in order to enhance its contrast (Jang, column 1, lines 6-10 and column 5, lines 32-34). Jang does not relate to rendering a computer graphic model of an object, rather Jang relates to digitally processing photographic or radiographic images of the object.

It would not have been obvious at the time of the invention to combine these two references because they relate to non-analogous art. Argiro relates to three-dimensional computer modeling, in which a computer-generated 3-D representation of the object is created, whereas Jang manipulates a two-dimensional photograph of the actual object. There would be no motivation to combine the image processing techniques for two-dimensional photographs of Jang with the method of Argiro that generates three-dimensional computer models from voxel data sets.

In addition, Argiro specifically discloses that its three-dimensional volume rendering method is superior to two-dimensional rendering methods (column 1, lines 60-65). Therefore, assuming arguendo that the x-ray photographs of Jang can be considered two-dimensional rendered images, one would have no motivation to combine Jang with Argiro because Argiro discloses explicitly that those images are inferior. It would not be obvious to combine one reference with another that explicitly states that the method of the first reference is inferior.

Finally, Jang discloses masking the irradiated image portion using image processing techniques to filter out the background, however, in Argiro it is desirable that voxels that are part of the rendered model should be made transparent. Combining the two references would result in the method of Jang eliminating some of the voxels of Argiro that should be retained. In this regard, the method of Jang would undermine to the volume rendering system of Argiro. Therefore, it would be counterproductive to combine the references.

At least for these reasons, one of ordinary skill in the art at the time of the invention would not have been motivated to combine Argiro and Jang as the Examiner suggests.

Furthermore, it would not have been obvious to combine Inbar with either of Argiro or Jang, because Inbar relates to a lighting device for backlighting a transparency (Inbar, column 1, lines 10-15 and column 7, lines 23-29). But both Argiro and Jang relate to processing images and computer models on a display screen. In these references, there are no transparencies that need to be backlit. Furthermore, even if the radiographic images of Jang were produced onto a transparency, the contrast of the image has already been enhanced by the method of Jang, so there would be no need for additional lighting enhancement using the backlight device of Inbar.

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At least for these reasons, it would not have been obvious at the time of the invention to combine Inbar with either Argiro or Jang.

Because it would not have been obvious at the time of the invention to combine the references cited by the Examiner, the rejection of claim 1 is traversed at least for this reason.

Our second basis for traversing the §103(a) rejection of the claims is that even if the references were combined as the Examiner suggests, the combination would not teach or suggest all of the features of the invention as claimed in claim 1.

Claim 1 is an independent claim, and claims 2-16 depend from claim 1. Therefore, Applicant focuses the discussion of the Examiner's rejections to claim 1. One of the features of the invention as claimed in claim 1 is "a display device, having...an image maximum luminance for displaying an image and an ordinary maximum luminance for displaying non-image information". Neither Argiro nor Jang teach or suggest such a feature. The Examiner does not allege that Inbar discloses or suggests any of the recitations of claim 1.

The Examiner alleges that Argiro discloses an image maximum luminance as element 414 of Fig. 23 and an ordinary maximum luminance as element 450 of Fig. 23. Applicant respectfully disagrees.

Argiro clearly discloses that elements 414 and 450 are nothing more than subdivisions of a larger image 448. In particular, element 414 is the "choose images" area, and element 450 refers to the patient information area (Argiro, column 26, lines 44-67). Argiro does not disclose that either of these sections relates to maximum luminance. In fact, Argiro discloses only that contrast or luminescence ratio is achieved with a slider shown in Figure 13 (Argiro column 20,

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9-47). But these slider controls for determining maximum luminescence are not present in Figure 23, and Figure 13 does not included an ordinary maximum luminance for displaying non-image information as the claim requires. Figure 13 only discloses changing the display of image information. Without making a distinction between the maximum levels in the image and non-image areas, Argiro includes the same deficiencies in the art, due to excessive brightness and viewer discomfort in the non-image areas.

Jang does not cure this deficiency in Argiro. Jang does not disclose displaying non-image information in any of the Figures or in the specification, so therefore, Jang cannot disclose an ordinary maximum luminance for displaying non-image information.

By way of another example, another of the features of the invention as claimed in claim 1 is “said ordinary maximum luminance being lower than said image maximum luminance”. The Examiner acknowledges that Argiro does not disclose this feature, but alleges that Jang does. Applicant respectfully disagrees.

Jang does not disclose an ordinary maximum luminance being lower than said image maximum luminance. The Examiner alleges that Figure 4 shows this feature. But the claim requires that the ordinary maximum luminance be for displaying non-image information, and no non-image information is displayed in Figure 4. Region 56 is the non-irradiation field, which means that the purpose of region 56 is to be blank. In other words, region 56 does not display any information at all. It is not “for displaying non-image information” as claim 1 requires (Jang, column 7, lines 40-43).

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In addition, while region 56 of Figure 4 is a low-intensity region and region 54 is a region of high-intensity exposure, both are part of the image information displayed. Region 56 comprises the unexposed border of the image (Jang, column 7, lines 5-7). Finally, the fact that one region has a higher intensity x-ray exposure than another says nothing about maximum luminance levels in those regions.

Because neither Argiro nor Jang considered separately or in combination teach or suggest at least these features of claim 1, claim 1 should be allowable. Claims 2-13 are allowable at least by virtue of their dependence on claim 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

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PATENT TRADEMARK OFFICE

Date: January 31, 2003

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "George G. Ballas", written over a horizontal line.

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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

14. (Amended) The display device of claim 13, said display device receiving a control signal supplied externally to distinguish image and non-image information for display and adjusting brightness of the display based on the control signal.

Claim 17 is added as a new claim.